

## ABSTRACT

The present invention provides a fluxgate magnetometer including a fluxgate and a digital processor. The digital processor includes an analog to digital converter for digitizing the back EMF from the fluxgate and a signal generator to generate the fluxgate driving signal. Further, a current sourcing circuit is provided to receive the fluxgate driving signal from the signal generator and transmit a current amplified driver signal to the fluxgate capable of driving the fluxgate in and out of saturation. The signal generator is a pulse width modulator used in conjunction with a voltage shaper and driver to create a triangle-shaped driving signal to excite the fluxgate. The digital processor is further configured to reverse the sign of the digital back EMF signal at a frequency corresponding to two times the frequency of the fluxgate driving signal thereby capturing only the second harmonic of the back EMF signal. The digital processor integrates the digital back EMF signal to generate a signal corresponding to the physical input of the fluxgate magnetometer.